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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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in its capacity as elected Office

Date of mailing (day/month/year)

13 December 2000 (13.12.00)

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PCT/NL00/00326

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P49386PC00

International filing date (day/month/year)

17 May 2000 (17.05.00)

Priority date (day/month/year)

18 May 1999 (18.05.99)

Applicant

BROUWER, Stefan, Frits

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

25 October 2000 (25.10.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Pascal Piriou

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

WO 00/69683
PCT/NL00/00326

TC

From the INTERNATIONAL BUREAU

PCT

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

Kopie in/naar	TERMIJN	PCT Rule 47.1(c), first sentence)
	01 DEC 2000	
	Date of mailing (day/month/year) Beantwoord voorl. 23 November 2000 (23.11.00)	Bericht gezonden aan
	Applicant's or agent's file reference de. MAP P49386PC00	

To:

PRINS, A., W.
Vereenigde
Nieuwe Parklaan 97
NL-2587 BN The Hague
PAYS-BAS

NRF2 18-11-2001 GUN

IMPORTANT NOTICE

International application No. PCT/NL00/00326	International filing date (day/month/year) 17 May 2000 (17.05.00)	Priority date (day/month/year) 18 May 1999 (18.05.99)
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Applicant

IKU HOLDING MONTFOORT B.V. et al

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

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In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

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The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on

23 November 2000 (23.11.00) under No. WO 00/69683

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

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It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

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PATENT COOPERATION TREATY

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From the INTERNATIONAL BUREAU

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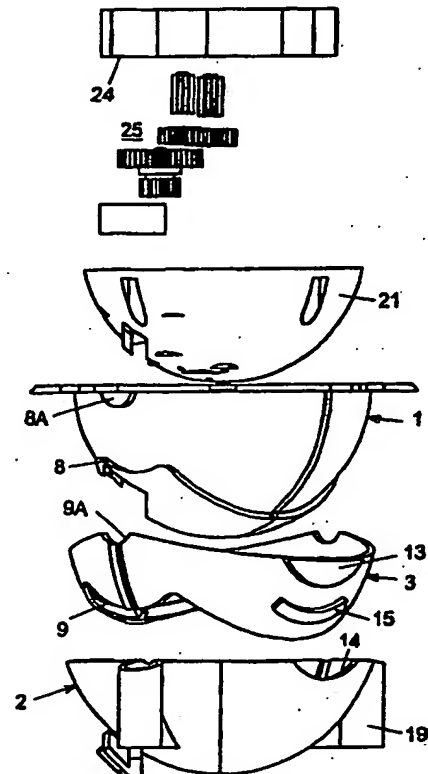
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(54) Title: MOVEMENT MECHANISM

(57) Abstract

A movement mechanism comprises a substantially spherical holder (1) and a substantially spherical bowl (2) which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis, which axes lie in a plane substantially coinciding with the plane of the outer edge of the holder or extending parallel thereto. Between the holder and the bowl, a dish (5) is present, which is connected to the bowl for rotation about the X-axis only and connected to the holder for rotation about the Y-axis only. In a particular application, a mirror can be secured on the holder and drive means can be arranged in the holder for rotating the holder relative to the bowl, so that an adjustable wing mirror for a vehicle can be realized.



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Title: Movement mechanism

The present invention relates to a movement mechanism comprising a substantially spherical holder and a substantially spherical bowl which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis, which axes
5 lie in a plane substantially coinciding with the plane of the outer edge of the holder or extending parallel thereto.

Such movement mechanism can, for instance, be used for causing an object that is fixedly connected to the holder to make a movement about two axes relative to a
10 fixedly disposed bowl, and can be used for, for instance, wing mirrors of vehicles, wherein a mirror plate can be mounted on the holder, while the bowl is mounted in the housing of the mirror plate, which housing can be secured
15 on a vehicle. Although such movement mechanism can be used for manually adjustable mirrors, the major advantage precisely resides in its application to motor-drivable mirrors, since the drive means for the mirror plate can then be fitted in the holder and a highly compact
20 construction of the mirror-adjusting means can be obtained, which, in view of the increasingly stringent requirements that are imposed on the dimensions of such mirror-adjusting means, is of great importance.

The object of the invention is to realize a relative
25 movement of a spherical holder with respect to a spherical bowl about two axes, in an extremely compact manner and with as few components as possible.

In accordance with the invention, the movement mechanism as described in the preamble is characterized in
30 that a dish located between the holder and the bowl is present, which dish is connected to the bowl for rotation about the X-axis only and which is connected to the holder for rotation about the Y-axis only. Such dish can be of an extremely thin design, so that the distance between the
35 bowl and the holder can also be kept minimal.

To obtain a guidance for the rotary movement of the holder and the dish relative to each other and at the same time a securement against rotations of these parts relative to each other about an axis, the Z-axis, perpendicular to the X-axis and the Y-axis, various solutions are possible. In a first embodiment, the dish may be provided with diametrically opposite thickenings which, upon rotation of the dish relative to the holder about the X-axis, cooperate with relevant slots in the holder that extend in the direction of rotation. In a second embodiment, the dish may be provided with diametrically opposite thickenings which, upon rotation of the dish relative to the holder about the X-axis, cooperate with relevant slots in the dish that extend in the direction of rotation. In a third embodiment, the dish may then may be provided with a thickening and a diametrically opposite slot that extends in the direction of rotation, which thickening and which slot, upon rotation of the dish relative to the holder about the X-axis, cooperate with a slot in the holder extending in the direction of rotation, or a diametrically opposite thickening on the holder respectively.

To ensure the connection between the holder and the dish, of course also during the relative movement of the two parts with respect to each other, the holder may have its outer surface provided with circularly curved edges which, upon rotation of the dish relative to the holder about the X-axis, serve as guide edges for correspondingly shaped edges provided on the dish. These circular edges may be recessed in or project from the holder.

For bounding the rotary travel between the holder and the dish, the holder may be provided with an outwardly directed, circular edge and the dish, viewed in a section perpendicular to the Y-axis, may be segment-shaped with an apex angle smaller than 180° , while in at least one extreme position of the dish relative to the holder, a relevant edge half of the dish abuts against the circular edge of

the holder. Of course, also in both extreme positions of the dish relative to the holder, the relevant edge halves of the dish may abut against relevant parts of the circular edge of the holder. In addition, it is also possible to
5 provide the holder, on the outer surface thereof, with at least one edge against which, in an extreme position of the dish relative to the holder, a corresponding edge of the dish abuts. This edge, too, may be recessed in as well as project from the holder. Here, too, two of such edges may
10 be present for the two extreme positions.

Likewise, and for similar reasons as apply to the movement between the holder and the dish, three embodiments are also possible for the movement between the bowl and the dish. In a first embodiment, the dish may be provided with
15 diametrically opposite thickenings which, upon rotation of the dish relative to the bowl about the Y-axis, cooperate with relevant slots in the bowl that extend in the direction of rotation. In a second embodiment, the bowl may again be provided with diametrically opposite thickenings
20 which, upon rotation of the dish relative to the bowl about the Y-axis, cooperate with relevant slots in the dish that extend in the direction of rotation, while in a third embodiment, the bowl may be provided with a thickening and a diametrically opposite slot that extends in the direction
25 of rotation, which thickening and which slot, upon rotation of the dish relative to the bowl about the Y-axis, cooperate with a slot in the dish extending in the direction of rotation, or a diametrically opposite thickening on the dish respectively.

30 Here, too, to ensure the connection between the bowl and the dish also during the relative movement of the two parts in respect of each other, the bowl may have its inside surface provided with circularly curved edges which, upon rotation of the dish relative to the bowl about the Y-
35 axis, serve as guide edges for correspondingly shaped edges provided on the dish.

To bound the rotary travel again, in this case between the bowl and the dish, the holder may be provided with an outwardly directed, circular edge, as mentioned above, while in at least one extreme position of the bowl
5 relative to the dish, the edge of the bowl abut against the circular edge of the holder. In an alternative embodiment herefor, in an extreme rotary position of the dish relative to the bowl, the above-mentioned thickenings for rotation and securement of the dish relative to the bowl may abut
10 against an end edge of the slots.

Further, additional locking means may be provided between the dish and the holder and between the dish and the bowl, for further blocking a rotation of the bowl, dish and holder relative to each other about an axis, the Z-
15 axis, perpendicular to the X-axis and the Y-axis.

Depending on the practical application of the movement mechanism, it may be important, when the dish is on both sides provided with outwardly set lips, to provide a defined friction between the bowl and the dish and
20 between the dish and the holder. Without these lips, a highly temperature-dependent friction would be present between said parts.

In a particularly favorable and inexpensive embodiment, the holder, the bowl and the dish may be
25 manufactured from plastic. In particular the various thickenings, slots, edges and additional locking means can readily be provided during the manufacturing of the holder, the bowl and the dish. Nevertheless, it is for instance also possible that the holder and the bowl are manufactured
30 from plastic and that the dish is substantially manufactured from metal. In particular, the dish may be punched from metal. In the case where the dish is substantially manufactured from metal, the dish may be provided with metal springs to effect a defined friction
35 between the bowl and the dish and between the dish and the holder.

As mentioned hereinabove, the major advantage of this movement mechanism precisely resides in the use of a motor drive of the holder relative to the bowl. To that end, in accordance with a further facet of the invention, the holder comprises two mutually perpendicular slots provided through the holder, each of said slots having a toothed element provided therein for displacement by motor, which toothed element is further freely movable in the bowl in a direction perpendicular to the direction of the relevant slot in the holder, wherein, further, the toothed element engages, through the relevant slot in the holder, a gear transmission mechanism placed in the holder, of a motor that is likewise placed in the holder. For the use in a wing mirror for a vehicle, an adjusting plate with a mirror can be fixed on the holder. When the motor and the drive mechanism are fitted in the holder as well, the holder with the components fitted therein and secured thereon can in a favorable manner be snap-fitted into the bowl as a unit. The latter construction further enables providing the holder with an electric plug terminal, while on the adjusting plate, a separate electric terminal is present for an electric connection to the plug terminal on the holder, enabling ready through-connecting by looping.

Apart from a movement mechanism, the invention also relates to a wing mirror for a vehicle, comprising a movement mechanism as indicated hereinabove.

The invention will presently be specified with reference to the accompanying drawings. In these drawings:

- Figs. 1-5 represent five views of the holder;
- Figs. 6-9 represent four views of the dish;
- Figs. 10-13 represent four views of the bowl;
- Figs. 14-17 represent four views of the assembly of the holder, the dish and the bowl of Figs. 1-13;
- Fig. 18 shows a section of this assembly taken on the line A-A in Fig. 14;

Figs. 19-22 represent four views of the assembly of the holder and the dish;

Figs. 23 and 24 show sections taken on the line B-B and C-C respectively in Fig. 19;

5 Figs. 25-28 represent four views of the assembly of the dish and the bowl;

Figs. 29 and 30 show sections taken on the line D-D and E-E respectively in Fig. 25;

10 Figs. 31-33 represent various exploded views of an actuator housing construction for a wing mirror of a vehicle;

Figs. 34-37 represent various views of an alternative embodiment of the dish;

15 Fig. 38 shows the adjusting element for enabling rotating the holder and the bowl relative to each other; and

Fig. 39 schematically shows a mirror actuator according to the invention.

20 In the Figures, identical parts are designated by the same reference numerals.

An exemplary embodiment of the movement mechanism according to the invention, as shown in parts and in interconnection of these parts in Figs. 1-33, comprises a
25 spherical holder 1, a spherical bowl 2 and a dish 3. The holder, the bowl and the dish are manufactured from plastic. With the interposition of the dish 3, the holder 1 can be inserted into the bowl 2. The dish 3 is then only rotatable about the X-axis relative to the bowl 2 and only
30 rotatable about the Y-axis relative to the holder 1, the X-axis and the Y-axis lying in a plane substantially coinciding with the outside edge of the holder 1.

To realize the rotatability of the holder 1 relative to the dish 3 about the Y-axis, two diametrically opposite
35 slots 4 and 5 are provided in the holder 1, and the dish 3 has its inside surface provided with thickenings 6 and 7

fitting in these slots 4 and 5 respectively. Upon rotation of the holder 1 relative to the dish 3 about the Y-axis, the thickenings 6 and 7 move in the slots 4 and 5 respectively. Further, the holder 1 has its outside surface provided with diametrically opposite, circularly curved edges 8 and 8a which, upon rotation of the holder 1 relative to the dish 3, serve as guide edges for correspondingly shaped edges of slots 9 and recesses 9a respectively, provided in the dish 3. Between the edges of the slots 9 and the circular recess 9a of the dish on the one hand and the thickenings 8 and 8a on the other, the holder 1 and the dish 3 are snap-fitted for movement relative to each other about the Y-axis.

To realize the rotatability of the dish 3 relative to the bowl 2 about the X-axis, two diametrically opposite slots 10 and 11 are provided in the bowl 2, and the dish 3 has its outside surface provided with thickenings 12 and 13 fitting in the slots 10 and 11 respectively. Upon rotation of the dish 3 relative to the bowl 2 about the X-axis, the thickenings 12 and 13 move in the slots 10 and 11 respectively. Further, the bowl 2 is provided with diametrically opposite, circular edges 14 which, upon rotation of the dish 3 relative to the bowl 2, serve as guide edges for correspondingly shaped edges of thickenings 15 provided on the outside surface of the dish 3. Between the thickenings 12, 13 on the one hand and the thickenings 15 on the other, the bowl 2 and the dish 3 are snap-fitted for movement relative to each other about the X-axis.

As extra securement against rotations about the Z-axis perpendicular to the X-axis and the Y-axis, additional locking means in the form of thickenings 16 provided on the outside surface of the dish 3 are present between the dish 3 and the bowl 2, which engage recesses 17 when the holder with dish are mounted in the bowl.

The movement of the holder 1 relative to the dish 3 and that of the dish relative to the bowl 2 is bounded. For

this purpose, the holder has an outwardly directed, circular edge 18. Further, viewed in a section perpendicular to the Y-axis, as shown in Fig. 8, the dish 3 is segment-shaped with an apex angle smaller than 180° .

5 When the holder 1 rotates about the Y-axis relative to the dish 3, the upper edges of the dish 3 will, in the two extreme positions, strike the edge 18. Upon rotation of the dish 3 relative to the bowl 2, the thickenings 12, 13 will, in the extreme positions, be arrested by the end edge of
10 the slots 10, 11 or, which is of course also possible, the upper edges of the bowl will be arrested by the projecting edge 18 of the holder.

The bowl 2 further comprises mounting bushes 19. By means of screws passed through these bushes, the bowl can
15 be secured in, for instance, a mirror housing frame for a wing mirror of a vehicle. When, in this practical application, a mirror-adjusting plate 33 with mirror 34 (see Fig. 39) is secured on the holder 1, in particular on the edge 18 hereof, this mirror is manually rotatable about
20 the X-axis and the Y-axis. The position of the holder, the dish and the bowl are shown, one inserted into the other, in Fig. 15, while different views are represented in Figs. 14, 16 and 17. For clarification, Figs. 19-24 show the situation where only the holder is secured in the dish for
25 rotation about the Y-axis, and Figs. 25-30 show the situation where only the dish is secured in the bowl for rotation about the X-axis.

The spherical construction of the holder 1, the dish 3 and the bowl 2 is particularly suitable for fitting a
30 drive system in the holder 1. In the above-mentioned practical application for a wing mirror, this means that in the holder, the drive system is mounted for rotating the mirror and hence the holder about the X-axis and the Y-axis relative to the bowl and hence relative to the mirror
35 housing frame. Because the drive system mounted in the holder 1 must be capable of engaging the bowl 2, relatively

large openings 20 are provided in the dish 3. As indicated in Figs. 31-33, the drive system is mounted in a spherical support 21 that can be screwed down in the holder 1. For that purpose, the holder 1 has screw bushes 22, while the support is at corresponding positions provided with screw holes 23. The holder 1 and the support 21 may also be manufactured as one whole. For the rotation about each of the two axes (the X-axis and the Y-axis), the drive system comprises, in a manner conventional for mirror actuators, a motor in a housing 24 and a transmission mechanism 25. These components form in fact the actuator; in Fig. 39, this actuator, including the housing 24, is designated by 35. Although in the transmission mechanism, a rod-shaped transmission can be incorporated, the transmission in the present embodiment is completely designed as a gear transmission mechanism. By means of this transmission mechanism 25, an adjusting element is displaced in a first direction, while this adjusting element is freely movable in a second direction perpendicular thereto. To enable, in this manner, a rotation of the holder 1 relative to the bowl 2, two slots 26 and 27 are provided in the holder 1, which slots, viewed in the X-Y plane, are perpendicular to each other, while in the bowl 2, two slots 28 and 29 are provided, which slots, viewed in the X-Y plane, are perpendicular to each other, the slot 26 intersecting the slot 28 centrally and perpendicularly, and the slot 27 intersecting the slot 29 centrally and perpendicularly. The slots 28 and 29 in the bowl 2 extend from the circumferential edge to the center of the bowl. To each pair of slots 26, 28 and 27, 29, it applies that an adjusting element 30 is freely movable in the slot 28 and 29 respectively; and motor-drivable in the slot 26 and 27 respectively. However, the reverse is of course also possible, i.e. an adjusting element may also be freely movable in the slot 26 and/or 27 and motor-drivable in the slot 28 and 29 respectively. Although the adjusting

elements 30 are provided between the bowl 2 and the holder 3, at the location of the openings 20 in the dish 3, the adjusting elements project through the holder 1 for motor engagement from the inner space of the holder 1. One of the two adjusting elements 30 is shown in more detail in Fig. 38. The free movability of the adjusting elements 30 is realized in that they have their bowl-facing sides provided with a projection 31 engaging the slots 28 and 29. On their side projecting through the holder, the adjusting elements 30 are provided with teeth 32. In the Figure, the adjusting elements are designed as ring segments having inside teeth; a construction as ring segment having, for instance, crown teeth or bevel gear teeth is of course also possible. These teeth then cooperate with a correspondingly formed gear of the gear transmission mechanism.

The direction in which the adjusting elements 30 are motor-drivable may correspond to the two axis directions. However, if stepping motors are used instead of standard dc-motors, it is preferred that the adjusting elements be displaced by motor at an angle of 45° relative the two axis directions; this situation is shown in the embodiment depicted here (see Figs. 1 and 10). Accordingly, upon rotation about one of the axes, both motors are actuated. Due to the motor displacement of one or both of the adjusting elements and the free movability in directions perpendicular hereto, a rotation of the holder 1 with support relative to the bowl 2 is effected and, accordingly, when used in a wing mirror of a vehicle, a rotation of the mirror-adjusting plate with mirror relative to the mirror housing in which the mirror housing frame with bowl are fixedly mounted.

During assembly, the bowl can already be fixedly secured on the mirror housing frame. The mirror actuator 35 with accessories can be assembled as a separate unit; this unit hence comprises the holder 1, the support 21 containing the motors and the transmission mechanism and

the mirror-adjusting plate 33 with mirror 34. Subsequently, such unit can as a whole be snapped in the bowl in a simple manner, with the interposition of the dish.

The movement mechanism according to the invention enables a mirror actuator housing construction wherein the mirror rotation point S (see Fig. 39) is a virtual rotation point, formed by the intersection of the X-axis and the Y-axis, relative to which the actuator housing, i.e. the holder 1 with the support 21 and accessories, is movably connected to the mirror housing frame, including bowl 2, while the mirror-adjusting plate 33 with mirror 34 is fixedly mounted on the actuator housing. Further, in accordance with the invention, a mirror actuator housing construction is enabled wherein the drive means, i.e. the actuator 35, in the actuator housing on the one hand and the mirror-adjusting plate 33 with mirror 34 on the other, are located on either side of the mirror rotation point S of the mirror-adjusting plate 33.

The electrically adjustable mirror construction hitherto described is further particularly suitable for fitting an electric wiring for realizing, apart from the electric mirror adjustment, other functions for the use of the mirror in the mirror housing. Such functions may for instance relate to a mirror heating, electrically dimming of incident light, keeping the mirror water-free through vibrations, and the like. To that end, the edge 18 of the holder 1 (Fig. 39) comprises an electric plug terminal 36 for a cable 37 realizing the connection to the electric board network of the vehicle. Further, on the mirror-adjusting plate 33, a separate electric terminal 38 is present for an electric connection 39 to the plug terminal 36. Likewise, a separate electric terminal 40 is present on the housing of the actuator 35 for an electric connection 41 to the plug terminal 36, the lines 39 and 41 each forming a fixed looped through-connection of a number of cores of the line 37. Since the actuator housing 35 moves

along with the mirror-adjusting plate 33, a vulnerable, flexible construction of the lines 39 and 41 is no longer necessary.

The invention is not limited to the embodiments
5 described hereinabove with reference to the Figures, but comprises all kinds of modifications hereof, of course in so far as these fall within the protective scope of the following claims. In particular, reference be made to a construction as shown in Figs. 34-37, where the dish 3 is
10 on either side provided with outwardly bent lips or resilient elements 40, i.e. lips or resilient elements directed both to the bowl 2 and to the holder 1. In this manner, a defined friction between the bowl and the dish and between the dish and the holder can be realized.

CLAIMS

1. A movement mechanism comprising a substantially spherical holder and a substantially spherical bowl which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis,
5 the Y-axis, said axes lying in a plane substantially coinciding with the plane of the outer edge of the holder or extending parallel thereto, characterized in that a dish located between the holder and the bowl is present, said dish being connected to the bowl for rotation about the X-axis only and connected to the holder for rotation about
10 the Y-axis only.
2. A movement mechanism according to claim 1, characterized in that the holder or the dish is provided with diametrically opposite thickenings which, upon
15 rotation of the dish relative to the holder about the X-axis, cooperate with relevant slots in the dish or holder respectively that extend in the direction of rotation.
3. A movement mechanism according to claim 1, characterized in that the dish is provided with a
20 thickening and a diametrically opposite slot that extends in the direction of rotation, said thickening and said slot, upon rotation of the dish relative to the holder about the X-axis, cooperating with a slot in the holder extending in the direction of rotation and a diametrically
25 opposite thickening on the holder respectively.
4. A movement mechanism according to claim 2 or 3, characterized in that the holder has its outer surface provided with circularly curved edges which, upon rotation of the dish relative to the holder about the X-axis, serve
30 as guide edges for correspondingly shaped edges provided on the dish.
5. A movement mechanism according to any one of the preceding claims, characterized in that the holder is

provided with an outwardly directed, circular edge and the dish, viewed in a section perpendicular to the X-axis, is segment-shaped with an apex angle smaller than 180° , while in at least one extreme position of the dish relative to the holder, a relevant edge half of the dish abuts against the circular edge of the holder.

6. A movement mechanism according to any one of the preceding claims, characterized in that the holder has its outer surface provided with at least one edge against which, in an extreme position of the dish relative to the holder, a corresponding edge of the dish abuts.

7. A movement mechanism according to any one of the preceding claims, characterized in that the bowl or the dish is provided with diametrically opposite thickenings which, upon rotation of the dish relative to the bowl about the Y-axis, cooperate with relevant slots in the dish or bowl respectively that extend in the direction of rotation.

8. A movement mechanism according to any one of the preceding claims, characterized in that the bowl is provided with a thickening and a diametrically opposite slot extending in the direction of rotation, said thickening and said slot, upon rotation of the dish relative to the bowl about the Y-axis, cooperating with a slot in the dish, extending in the direction of rotation, and a diametrically opposite thickening on the dish respectively.

9. A movement mechanism according to claim 7 or 8, characterized in that the bowl is provided with circularly curved edges which, upon rotation of the dish relative to the bowl about the Y-axis, serve as guide edges for correspondingly shaped edges provided on the dish.

10. A movement mechanism according to any one of the preceding claims, characterized in that the holder is provided with an outwardly directed, circular edge, while in at least one extreme position of the bowl relative to

the dish, an edge of the bowl abuts against the circular edge of the holder.

11. A movement mechanism according to any one of claims 7-9, characterized in that in an extreme rotary position of the dish relative to the bowl, the thickenings for rotation and securement of the dish relative to the bowl are located against an end edge of the slots.

12. A movement mechanism according to any one of the preceding claims, characterized in that additional locking means are provided between the dish and the holder and between the dish and the bowl, for blocking a rotation of the bowl, dish and holder relative to each other about an axis, the Z-axis, perpendicular to the X-axis and the Y-axis.

13. A movement mechanism according to any one of the preceding claims, characterized in that the dish is on both sides provided with outwardly set lips, to provide a defined friction between the bowl and the dish and between the dish and the holder.

14. A movement mechanism according to any one of the preceding claims, characterized in that the holder, the bowl and the dish are manufactured from plastic.

15. A movement mechanism according to any one of the preceding claims, characterized in that the holder and the bowl are manufactured from plastic and the dish is substantially manufactured from metal.

16. A movement mechanism according to claim 15, characterized in that the dish is punched from metal.

17. A movement mechanism according to claim 15 or 16, characterized in that the dish is provided with metal springs for realizing a defined friction between the bowl and the dish and between the dish and the holder.

18. A movement mechanism according to any one of the preceding claims, characterized in that the holder, viewed in the X-Y plane, comprises two mutually perpendicular slots provided through the holder, each of said slots

having an adjusting element provided therein for displacement by motor, said adjusting element being further freely movable in the bowl in a direction, viewed in the X-Y plane, perpendicular to the direction of the relevant

5 slot in the holder, wherein, further, the adjusting element engages, through the relevant slot in the holder, a drive mechanism placed in the holder, said drive mechanism being connected to a motor that is likewise placed in the holder.

19. A movement mechanism according to claim 18,
10 characterized in that on the holder, an adjusting plate for, for instance, a mirror is secured, and that the holder with the components fitted therein and secured thereon can be snapped into the bowl as a unit.

20. A movement mechanism according to claim 19,
15 characterized in that the holder comprises an electric plug terminal, while on the adjusting plate, a separate electric terminal is present for an electric connection to the plug terminal on the holder.

21. A wing mirror for a vehicle, comprising a movement
20 mechanism according to any one of the preceding claims.

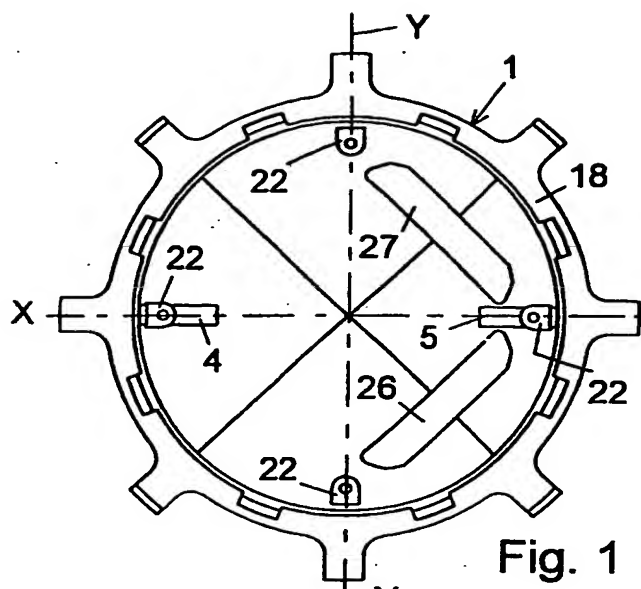


Fig. 1

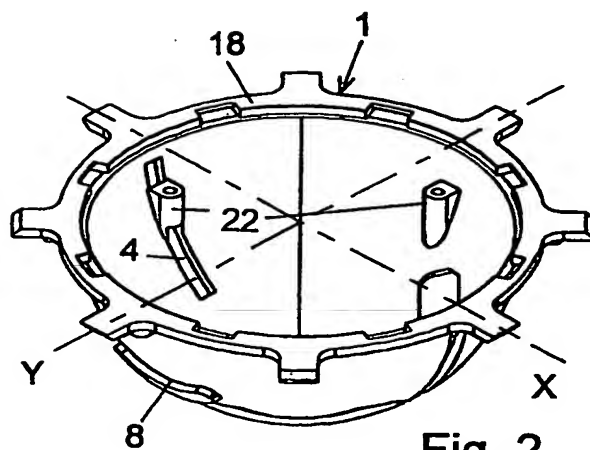


Fig. 2

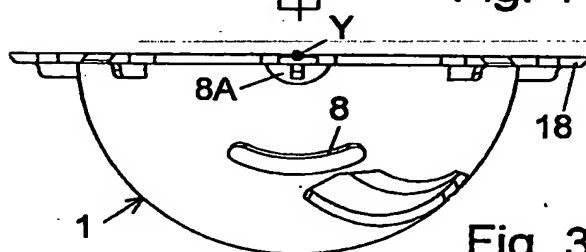


Fig. 3

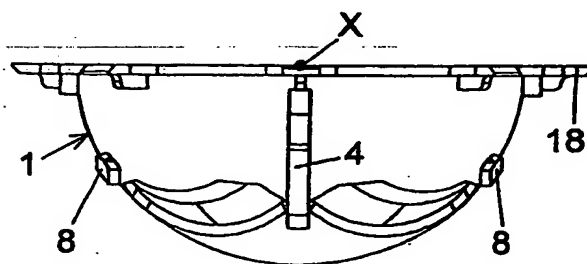


Fig. 4

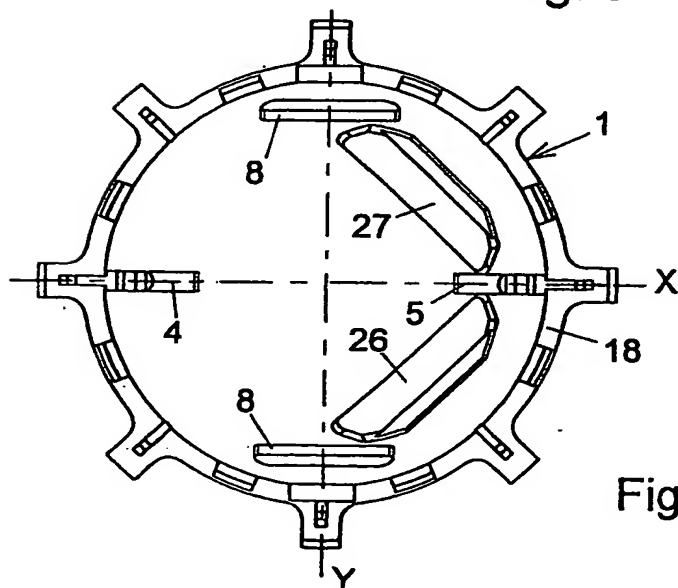


Fig. 5

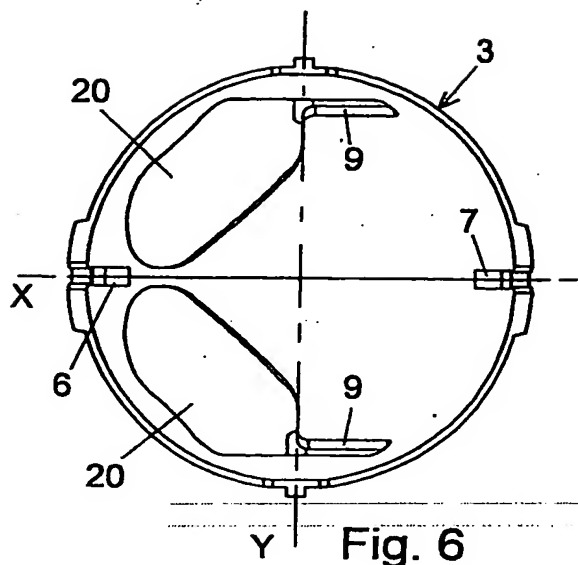


Fig. 6

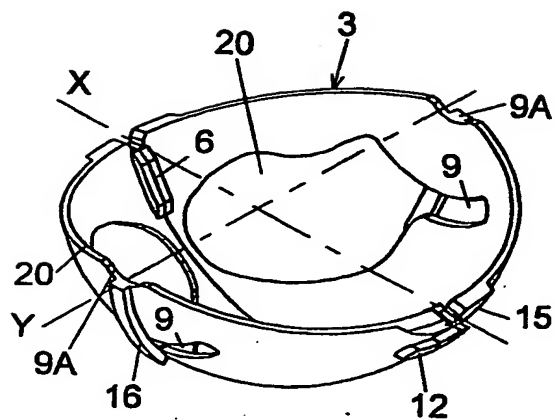


Fig. 7

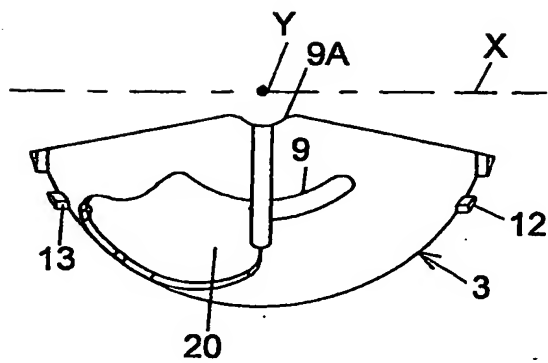


Fig. 8

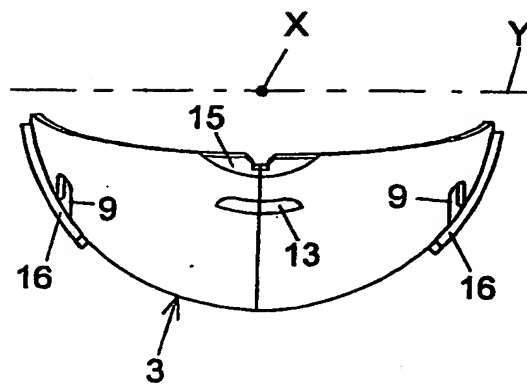


Fig. 9

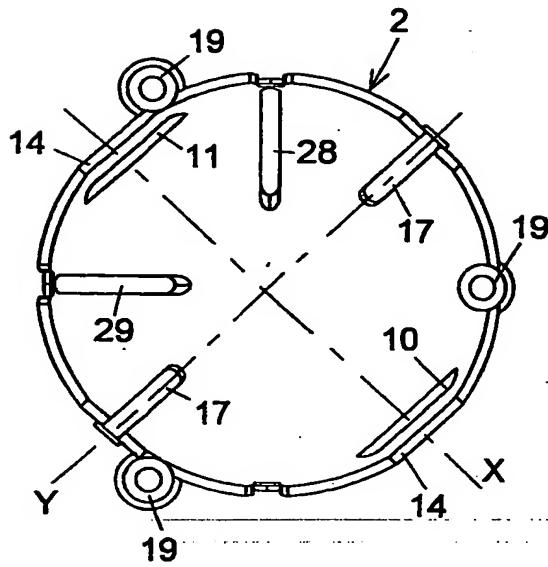


Fig. 10

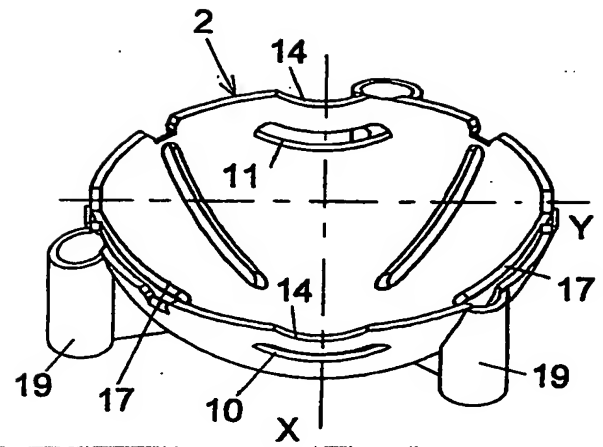


Fig. 11

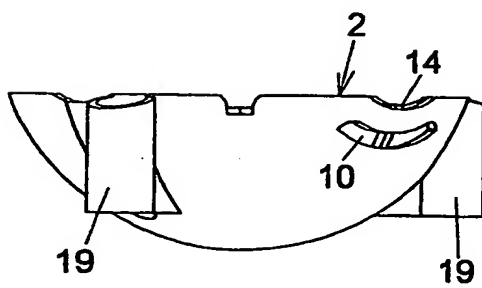


Fig. 12

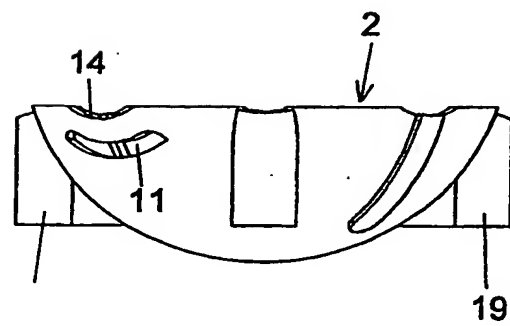


Fig. 13

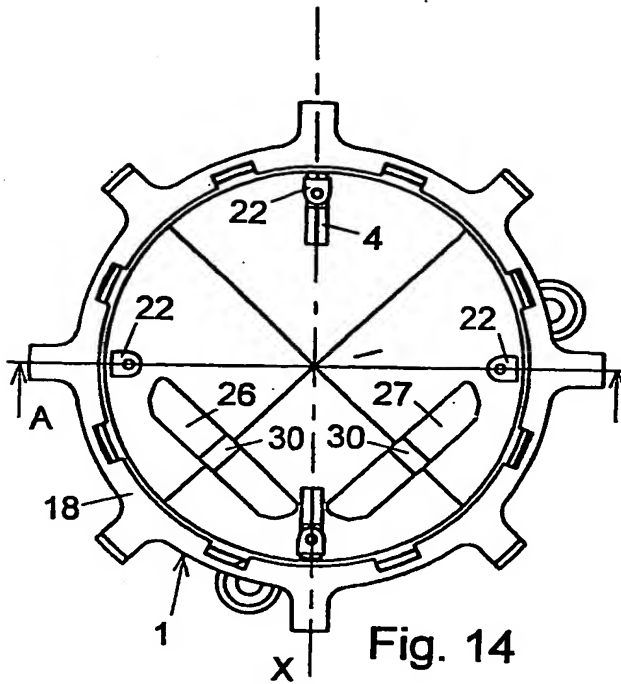


Fig. 14

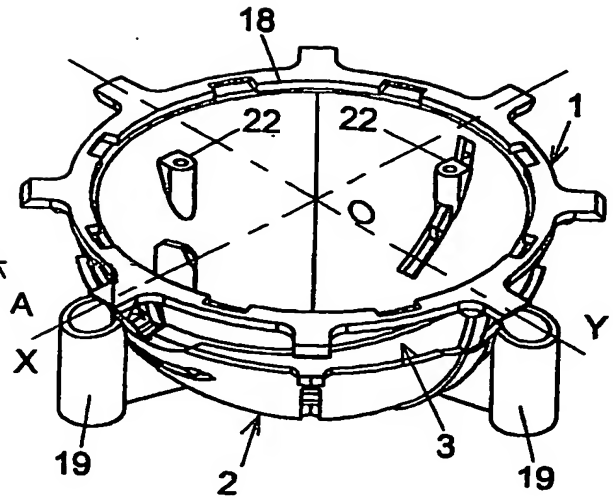


Fig. 15

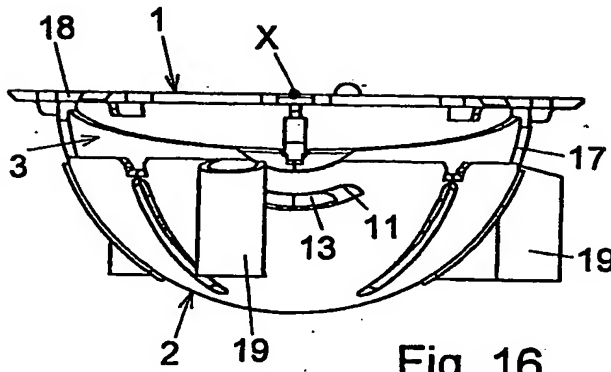


Fig. 16

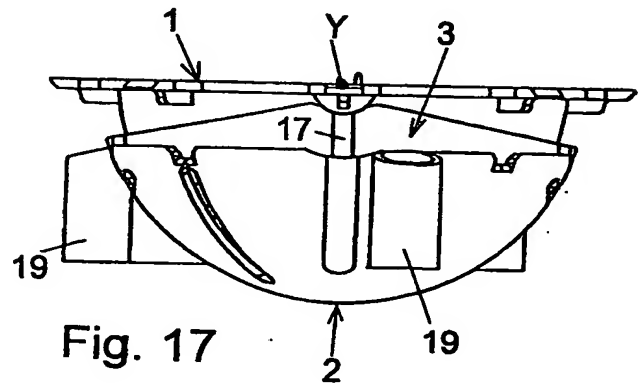


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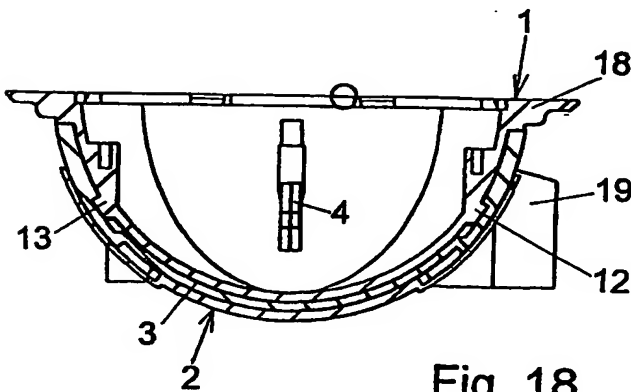


Fig. 18

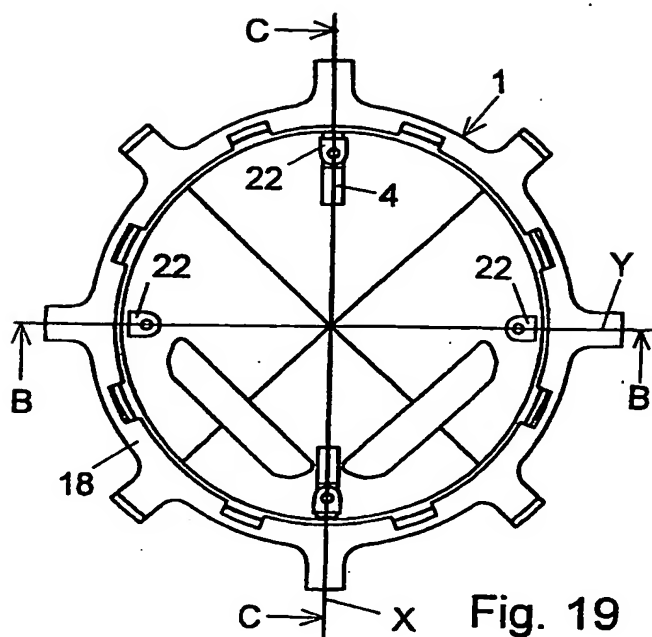


Fig. 19

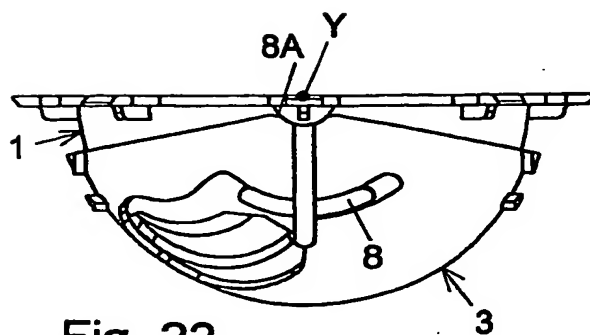


Fig. 22

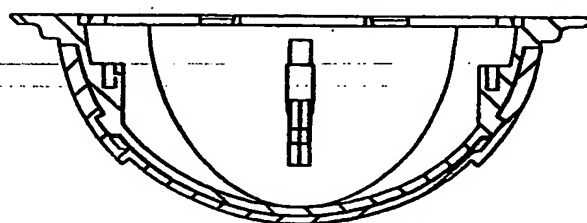


Fig. 23

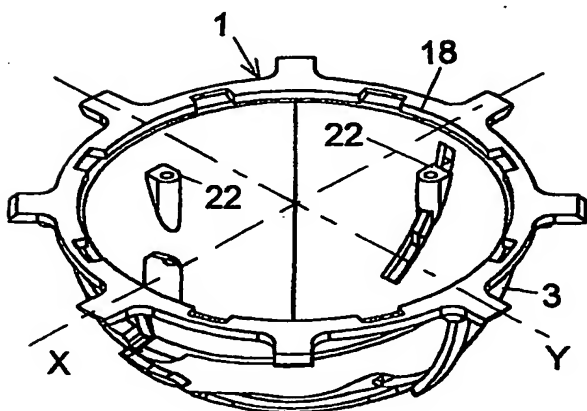


Fig. 20

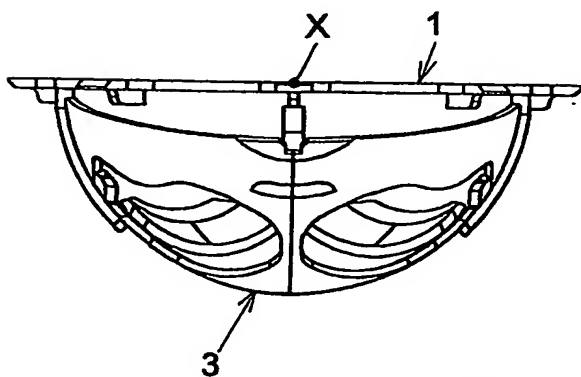


Fig. 21

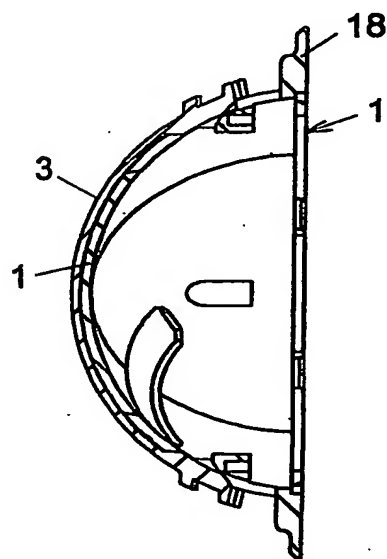


Fig. 24

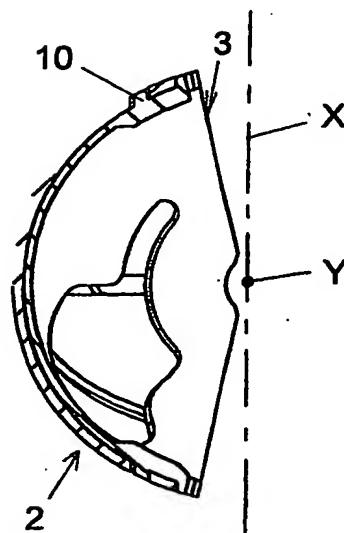
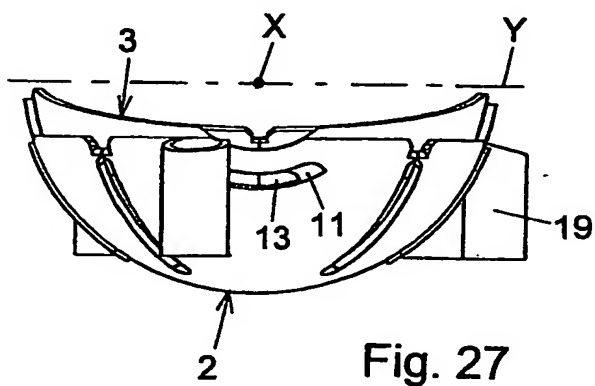
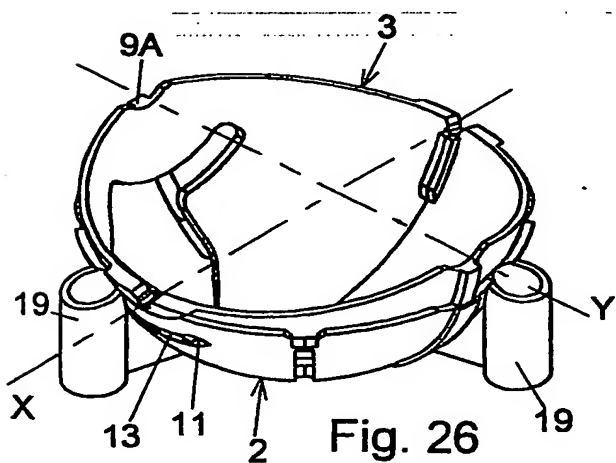
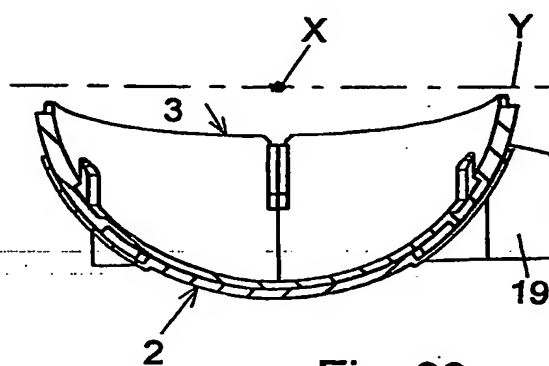
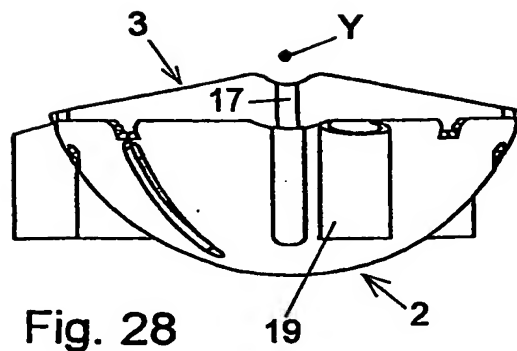
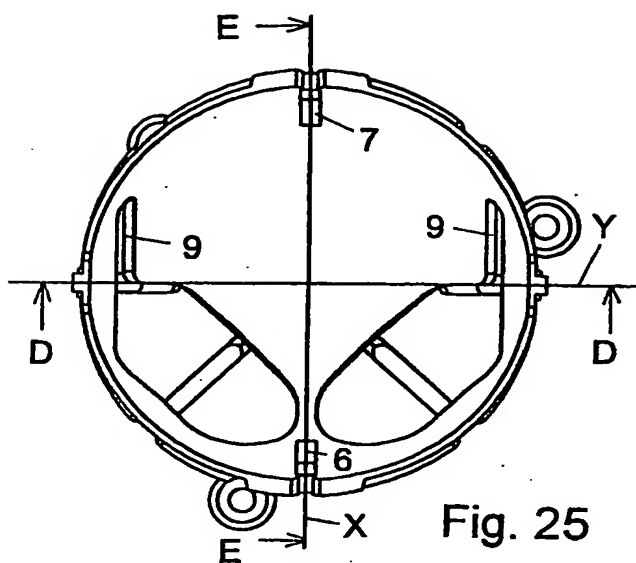


Fig. 30

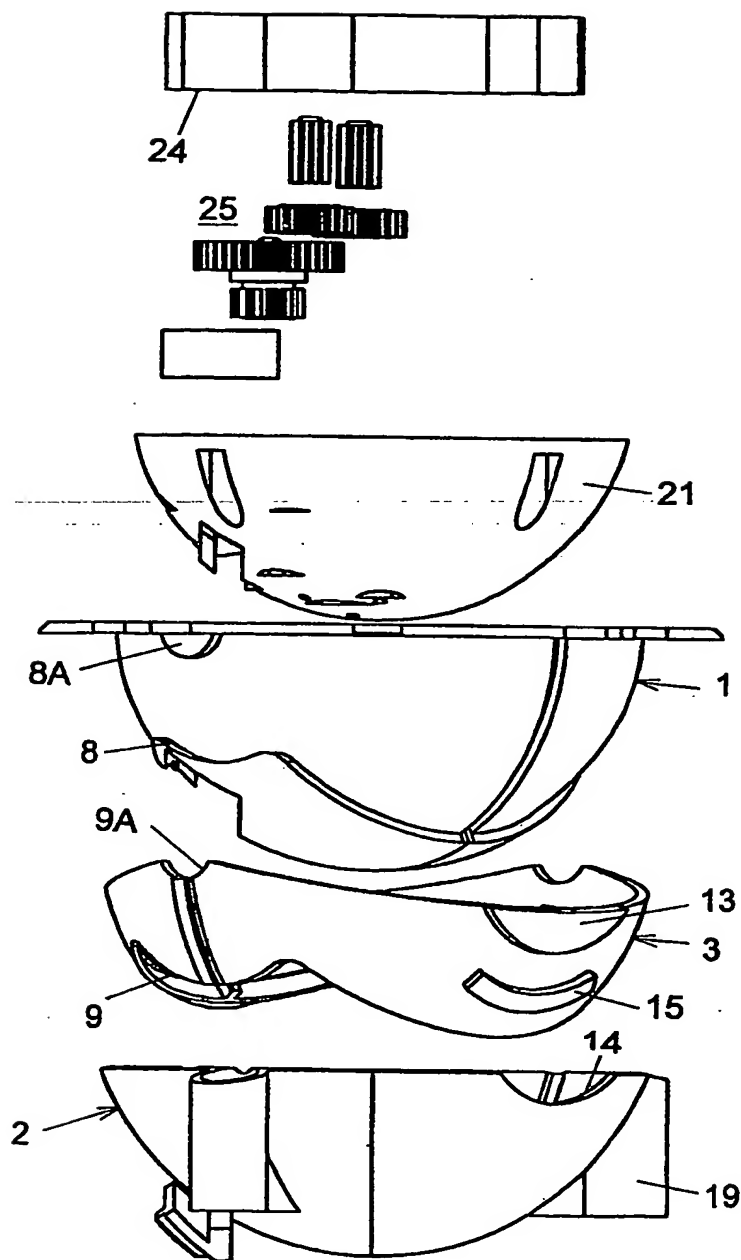


Fig. 31

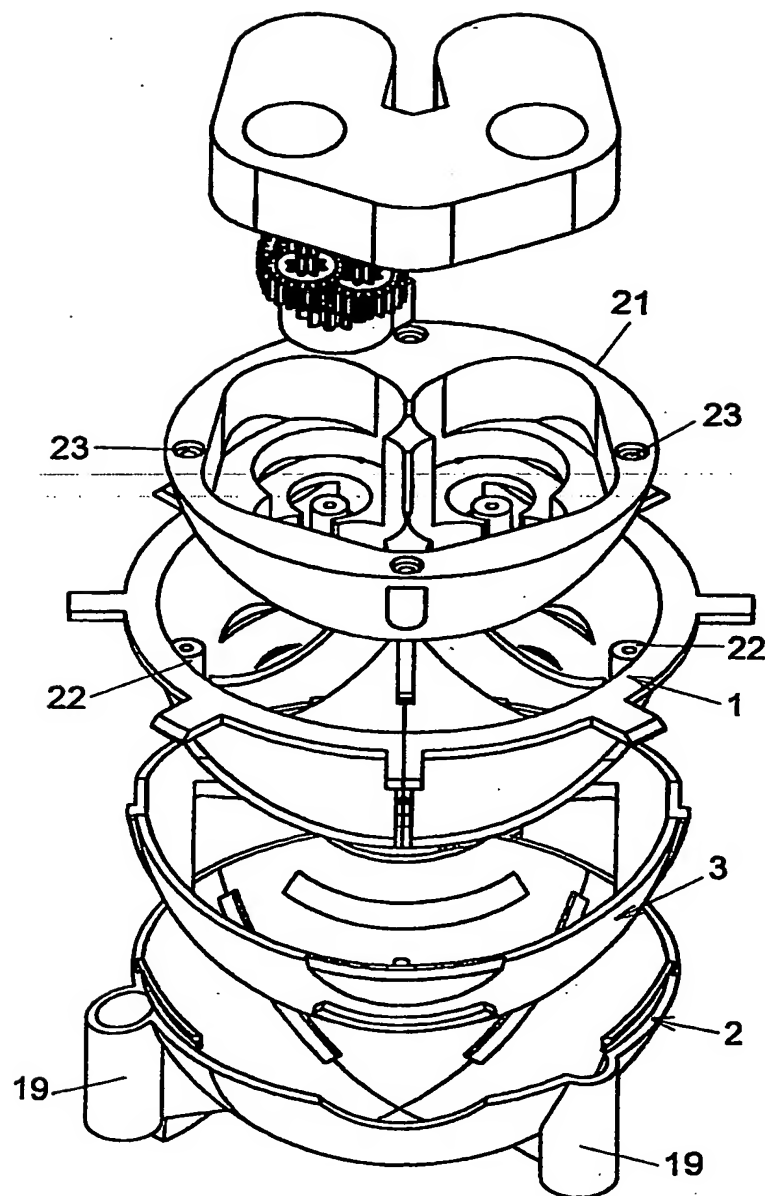


Fig. 32

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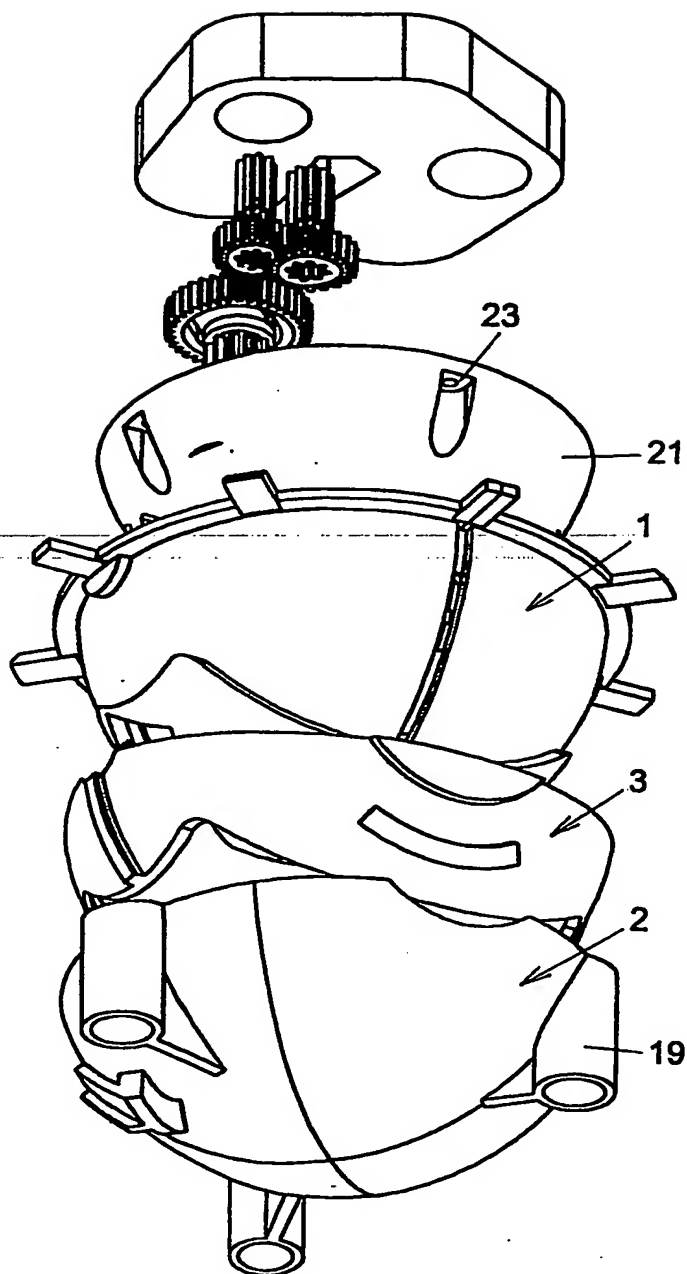


Fig. 33

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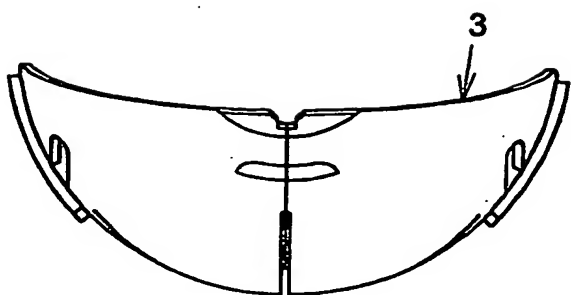


Fig. 34

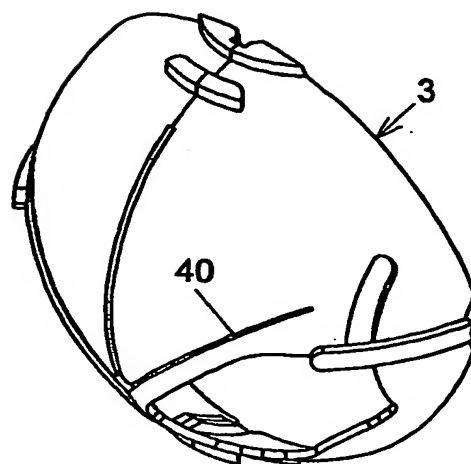


Fig. 35

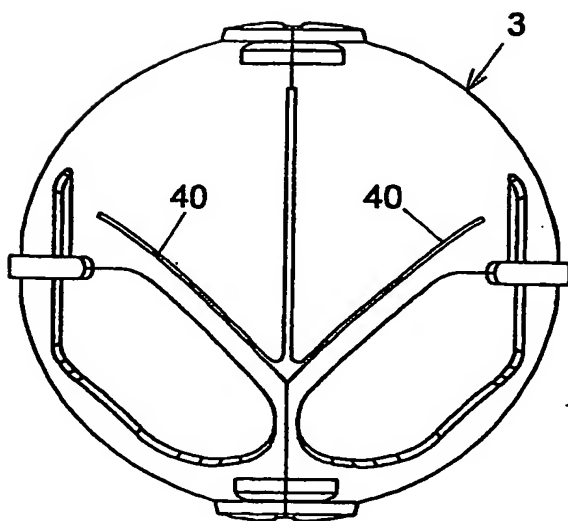


Fig. 36

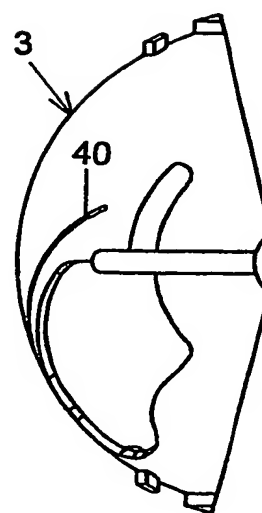


Fig. 37

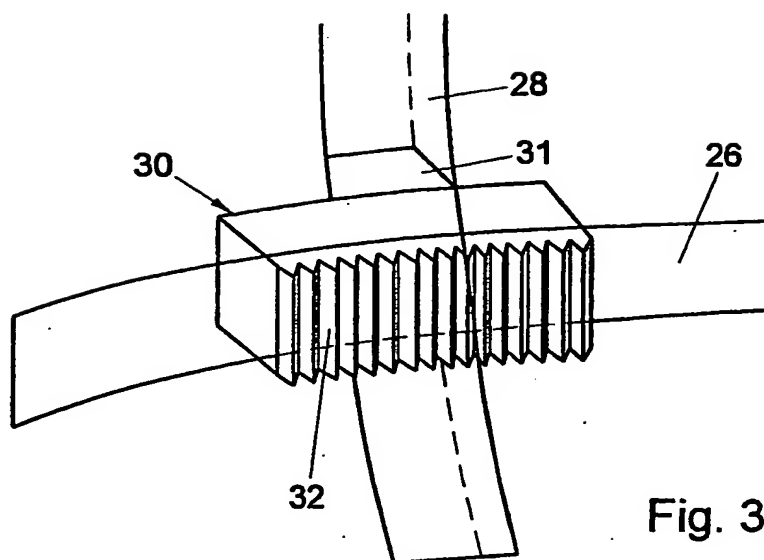


Fig. 38

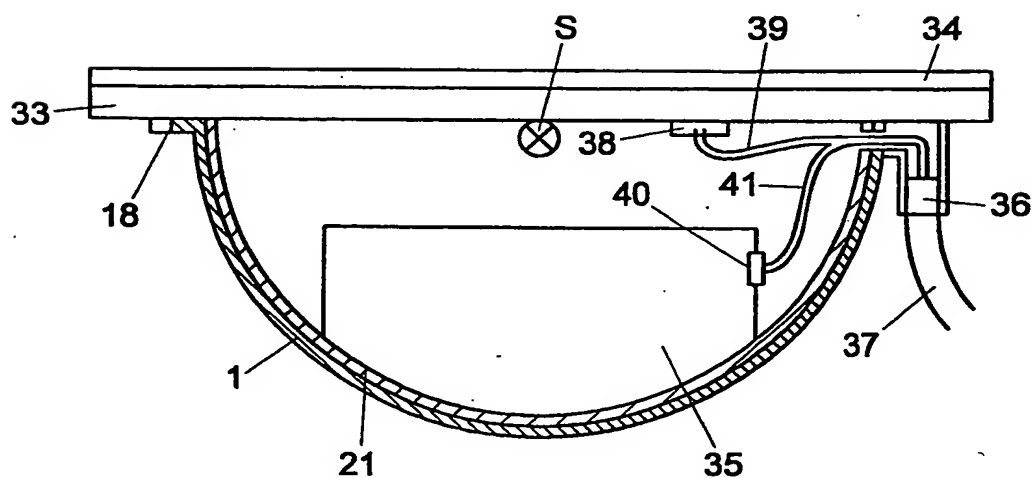


Fig. 39

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P49386PC00	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/NL 00/ 00326	International filing date (day/month/year) 17/05/2000	(Earliest) Priority Date (day/month/year) 18/05/1999
Applicant IKU HOLDING MONTFOORT B.V. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

31

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NL 00/ 00326

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The abstract is modified as follows:

line 2: after "spherical holder" insert "(1)";
line 2: after "spherical bow" insert "(2)";
line 8: after "a dish" insert "(5)".

INTERNATIONAL SEARCH REPORT

International Application No

PCT 00/00326

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B60R1/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 075 259 A (BOSCH) 30 March 1983 (1983-03-30) abstract	1,21
A	US 4 991 950 A (LANG) 12 February 1991 (1991-02-12) column 4, line 32-38	20
A	WO 98 31565 A (MAGNA REFLEX) 23 July 1998 (1998-07-23)	
A	WO 98 26956 A (LOWELL) 25 June 1998 (1998-06-25)	
A	WO 95 05295 A (LOWELL) 23 February 1995 (1995-02-23)	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

9 August 2000

Date of mailing of the international search report

17/08/2000

Name and mailing address of the ISA

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 Fax: (+31-70) 340-3016

Authorized officer

Knops, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/00/00326

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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			JP 9501632 T	18-02-1997

LE

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

To:

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VEREENIGDE
Nieuwe Parklaan 97
NL-2587 BN The Hague
PAYS-BAS

NRF₂ 18-11-2001

23 AUG 2001

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def.

Bericht gezonden
aan *client*

tel. 05-09-01

Applicant's or agent's file reference

MAP

P49386PC00

Date of mailing
(day/month/year)

17.08.2001

IMPORTANT NOTIFICATION

International application No.
PCT/NL00/00326

International filing date (day/month/year)
17/05/2000

Priority date (day/month/year)
18/05/1999

Applicant

IKU HOLDING MONTFOORT B.V. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



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10/009358

EPO - DG 1

28. 06. 2001

New Page 1

(41)

Title: Movement mechanism

The present invention relates to a movement mechanism comprising a spherical holder and a spherical bowl which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis, said axes lying in a plane coinciding with the plane of the outer edge of the holder or extending parallel thereto, the movement mechanism further comprising a dish located between the holder and the bowl, said dish being connected to the bowl for rotation about the X-axis only and connected to the holder for rotation about the Y-axis only.

Such movement mechanism is known from EP-A-0 075 259. The movement mechanism in said document comprises a bowl, a holder and a dish, wherein the holder can rotate relative to the dish around a first axis only and the bowl can rotate relative to the dish around a second axis only. The bowl, the holder and the dish are mounted together by means of a bolt which fills the inner space of the holder, such that no further construction parts can be placed therein. The movement mechanism is a type of ball joint.

The movement mechanism can, for instance, be used for causing an object that is fixedly connected to the holder to make a movement about two axes relative to a fixedly disposed bowl, and can be used for, for instance, wing mirrors of vehicles, wherein a mirror plate can be mounted on the holder, while the bowl is mounted in the housing of the mirror plate, which housing can be secured on a vehicle.

The object of the invention is to realize a movement mechanism, which, for instance for application to a motor-drivable wing mirror of a vehicle, permits an extremely compact construction with as few components as possible.

Therefore, in accordance with the invention, the movement mechanism as described in the opening paragraph is characterized in that

New Page 1a

that fitted in the holder there is provided an actuator, the actuator being operatively connected to the bowl through openings in the holder and an opening in the dish for rotating the holder relative to the bowl about the X- and Y-axis.

10/009358

EPO - DG 1

Int. pat. appln. no. PCT/NL00/00326
Our letter of June 28, 2001

28. 06. 2001

(41)

New claims

1. A movement mechanism comprising a spherical holder (1) and a spherical bowl (2) which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis, said axes lying in a plane coinciding with the plane of the outer edge of the holder (1) or extending parallel thereto, the movement mechanism further comprising a dish (3) located between the holder (1) and the bowl (2), said dish (3) being connected to the bowl (2) for rotation about the X-axis only and connected to the holder (1) for rotation about the Y-axis only, characterized in that fitted in the holder (1) there is provided an actuator (35), the actuator being operatively connected to the bowl (2) through openings (26, 27) in the holder (1) and an opening (20) in the dish (3) for rotating the holder (1) relative to the bowl (2) about the X- and Y-axis.
2. A movement mechanism according to claim 1, characterized in that the holder (1) or the dish (3) is provided with diametrically opposite thickenings (6, 7) which, upon rotation of the dish (3) relative to the holder (1) about the X-axis, cooperate with relevant slots (4, 5) in the dish (3) or holder (1) respectively that extend in the direction of rotation.
3. A movement mechanism according to claim 1, characterized in that the dish (3) is provided with a thickening and a diametrically opposite slot that extends in the direction of rotation, said thickening and said slot, upon rotation of the dish (3) relative to the holder (1) about the X-axis, cooperating with a slot in the holder extending in the direction of rotation and diametrically opposite thickening on the holder (1) respectively.
4. A movement mechanism according to claim 2 or 3, characterized in that the holder has its outer surface provided with circularly curved edges (8, 8a)

which, upon rotation of the dish (3) relative to the holder (1) about the X-axis, serve as guide edges for correspondingly shaped edges (9, 9a) provided on the dish (3).

5. A movement mechanism according to any one of the preceding claims, characterized in that the holder (1) is provided with an outwardly directed, circular edge (18) and the dish (3), viewed in a section perpendicular to the X-axis, is segment-shaped with an apex angle smaller than 180° , while in at least one extreme position of the dish (3) relative to the holder (1), a relevant edge half of the dish (3) abuts against the circular edge (18) of the holder (1).

6. A movement mechanism according to any one of the preceding claims, characterized in that holder (1) has its outer surface provided with at least one edge against which, in an extreme position of the dish (3) relative to the holder (1), a corresponding edge of the dish (3) abuts.

7. A movement mechanism according to any one of the preceding claims, characterized in that the bowl (2) or the dish (3) is provided with diametrically opposite thickenings which, upon rotation of the dish (3) relative to the bowl (2) about the Y-axis, cooperate with relevant slots (10, 11) in the dish (3) or bowl (2) respectively that extend in the direction of rotation.

8. A movement mechanism according to any one of the preceding claims, characterized in that the bowl (2) is provided with a thickening and a diametrically opposite slot extending in the direction of rotation, said thickening and said slot, upon rotation of the dish relative to the bowl (2) about the Y-axis, cooperating with a and a diametrically opposite thickening on the dish (3) respectively.

9. A movement mechanism according to claim 7 or 8, characterized in that the bowl (2) is provided with circularly curved edges (14) which, upon rotation of the dish (3) relative to the bowl (2) about the Y-axis, serve as guide edges for correspondingly shaped edges (15) provided on the dish (3).

10. A movement mechanism according to any one of the preceding claims, characterized in that the holder (1) is provided with an outwardly directed,

circular edge (18), while in at least one extreme position of the bowl (2) relative to the dish (3), an edge of the bowl (2) abuts against the circular edge (18) of the holder (1).

11. A movement mechanism according to any one of claims 7-9, characterized in that in an extreme rotary position of the dish (3) relative to the bowl (2), the thickenings (12, 13) for rotation and securement of the dish relative to the bowl (2) are located against an end edge of the slots (10, 11).

12. A movement mechanism according to any one of the preceding claims, characterized in that additional locking means (16) are provided between the dish (3) and the holder (1) and between the dish (3) and the bowl (2), for blocking a rotation of the bowl (2), dish (3) and holder (1) relative to each other about an axis, the Z-axis, perpendicular to the X-axis and the Y-axis.

13. A movement mechanism according to any one of the preceding claims, characterized in that the dish (3) is on both sides provided with outwardly set lips (40), to provide a defined friction between the bowl (2) and the dish (3) and between the dish (3) and the holder (1).

14. A movement mechanism according to any one of the preceding claims, characterized in that the holder (1), the bowl (2) and the dish (3) are manufactured from plastic.

15. A movement mechanism according to any one of the preceding claims, characterized in that the holder (1) and the bowl (2) are manufactured from plastic and the dish (3) is substantially manufactured from metal.

16. A movement mechanism according to claim 15, characterized in that the dish (3) is punched from metal.

17. A movement mechanism according to claim 15 or 16, characterized in that the dish (3) is provided with metal springs for realizing a defined friction between the bowl (2) and the dish (3) and between the dish (3) and the holder (1).

18. A movement mechanism according to any one of the preceding claims, characterized in that the holder (1), viewed in the X-Y plane, comprises two

mutually perpendicular slots (26, 27) provided through the holder (1), each of said slots (26, 27) having an adjusting element (30) being further freely movable in the bowl (2) in a direction, viewed in the X-Y plane, perpendicular to the direction of the relevant slot (26, 27) in the holder (1), wherein, further, the adjusting element (30) engages, through the relevant slot (26, 27) in the holder (1), a drive mechanism placed in the holder (1), said drive mechanism being connected to a motor that is likewise placed in the holder (1).

19. A movement mechanism according to claim 18, characterized in that on the holder (1), an adjusting plate (33) for, for instance, a mirror (34) is secured, and that the holder (1) with the components fitted therein and secured thereon can be snapped into the bowl (2) as a unit.

20. A movement mechanism according to claim 19, characterized in that the holder (1) comprises an electric plug terminal (36), while on the adjusting plate (33), a separate electric terminal (38) is present for an electric connection to the plug terminal (36) on the holder (1).

21. A wing mirror for a vehicle, comprising a movement mechanism according to any one of the preceding claims.

REC'D 21 AUG 2001

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P49386PC00	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/NL00/00326	International filing date (day/month/year) 17/05/2000	Priority date (day/month/year) 18/05/1999
International Patent Classification (IPC) or national classification and IPC B60R1/06		
Applicant IKU HOLDING MONTFOORT B.V. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 25/10/2000	Date of completion of this report 17.08.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Rinchart, L Telephone No. +49 89 2399 8160 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL00/00326

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

2-12	as originally filed	
1,1a	with telefax of	28/06/2001

Claims, No.:

1-21	with telefax of	28/06/2001
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Drawings, sheets:

1/11-11/11	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL00/00326

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-21
	No:	Claims	-
Inventive step (IS)	Yes:	Claims	1-21
	No:	Claims	-
Industrial applicability (IA)	Yes:	Claims	1-21
	No:	Claims	-

2. Citations and explanations see separate sheet

**Re Item V Reasoned statement under Article 35(2) with regard to novelty,
inventive step or industrial applicability; citations and
explanations supporting such statement**

V.1. State of the Art

1. Reference is made to the following document:

D1: EP-A-0 075 259 (BOSCH) 30 March 1983 (1983-03-30)

**V.2. Novelty, inventive step and industrial applicability of the subject-matter of
independent claim 1**

1. The document D1 is regarded as being the closest prior art to the subject-matter of amended claim 1, and shows (the references in parentheses applying to this document):
- a) a movement mechanism (abstract) comprising
 - b) a spherical holder (fig. 1, ref. 24 and 26) and
 - c) a spherical bowl (fig. 1, ref. 10 and 12)
 - d) which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis (fig. 1 and page 4, lines 19 to 21),
 - e) the movement mechanism further comprising a dish located between the holder and the bowl (fig. 1, ref. 18),
 - f) said dish being connected to the bowl for rotation about the X-axis only and connected to the holder for rotation about the Y-axis only (fig. 1 and 4, ref. 18; claim 1).

The subject-matter of amended claim 1 differs from this known movement mechanism in that;

- g) the said axes lie in a plane coinciding with the plane of the outer edge of the holder or extend parallel thereto,
- h) fitted in the holder there is provided an actuator,

- i) the actuator being operatively connected to the bowl through openings in the holder and an opening in the dish for rotating the holder relative to the bowl about the X- and Y-axis.

The subject-matter of amended claim 1 is therefore **novel** (Article 33(2) PCT).

- 2. The problem to be solved by the present invention may therefore be regarded as to provide a movement mechanism, e.g., for application to a motor-driveable wing-mirror of a vehicle, which permits a compact construction with as few components as possible.
- 3. The solution to this problem proposed in amended claim 1 of the present application is considered as involving an **inventive step** (Article 33(3) PCT) for the following reasons:
 - ☐ The feature g) here above permits to improve the compactness of an arrangement such as the one known from D1, in a manner not known from the present prior art.
 - ☐ Although the feature h) is partially very well known from the prior art, the fact of fitting the actuator in the holder which operates rotations of the bowl around both X and Y directions (feature i)) is not known from nor rendered obvious in the present prior art.
- 4. The subject-matter of independent claim 1 is also industrially applicable (Article 33(4) PCT) as demonstrated by the embodiment disclosed in the description of the present application.

V.3. Novelty, inventive step and industrial applicability of the subject-matters of dependent claims 2 to 21

- 1. Claims 2 to 21 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 2. Furthermore the subject-matters of those claims can be considered as industrially applicable (article 33(4) PCT).

REPLACED BY
APP 34 AMDT

Title: Movement mechanism

The present invention relates to a movement mechanism comprising a substantially spherical holder and a substantially spherical bowl which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis, which axes lie in a plane substantially coinciding with the plane of the outer edge of the holder or extending parallel thereto.

Such movement mechanism can, for instance, be used for causing an object that is fixedly connected to the holder to make a movement about two axes relative to a fixedly disposed bowl, and can be used for, for instance, wing mirrors of vehicles, wherein a mirror plate can be mounted on the holder, while the bowl is mounted in the housing of the mirror plate, which housing can be secured on a vehicle. Although such movement mechanism can be used for manually adjustable mirrors, the major advantage precisely resides in its application to motor-drivable mirrors, since the drive means for the mirror plate can then be fitted in the holder and a highly compact construction of the mirror-adjusting means can be obtained, which, in view of the increasingly stringent requirements that are imposed on the dimensions of such mirror-adjusting means, is of great importance.

The object of the invention is to realize a relative movement of a spherical holder with respect to a spherical bowl about two axes, in an extremely compact manner and with as few components as possible.

In accordance with the invention, the movement mechanism as described in the preamble is characterized in that a dish located between the holder and the bowl is present, which dish is connected to the bowl for rotation about the X-axis only and which is connected to the holder for rotation about the Y-axis only. Such dish can be of an extremely thin design, so that the distance between the bowl and the holder can also be kept minimal.

CLAIMS

1. A movement mechanism comprising a substantially spherical holder and a substantially spherical bowl which, one inserted into the other, are rotatable relative to each other about a first axis, the X-axis, and a second axis, the Y-axis, said axes lying in a plane substantially coinciding with the plane of the outer edge of the holder or extending parallel thereto, **characterized in that** a dish located between the holder and the bowl is present, said dish being connected to the bowl for rotation about the X-axis only and connected to the holder for rotation about the Y-axis only.

2. A movement mechanism according to claim 1, characterized in that the holder or the dish is provided with diametrically opposite thickenings which, upon rotation of the dish relative to the holder about the X-axis, cooperate with relevant slots in the dish or holder respectively that extend in the direction of rotation.

3. A movement mechanism according to claim 1, characterized in that the dish is provided with a thickening and a diametrically opposite slot that extends in the direction of rotation, said thickening and said slot, upon rotation of the dish relative to the holder about the X-axis, cooperating with a slot in the holder extending in the direction of rotation and a diametrically opposite thickening on the holder respectively.

4. A movement mechanism according to claim 2 or 3, characterized in that the holder has its outer surface provided with circularly curved edges which, upon rotation of the dish relative to the holder about the X-axis, serve as guide edges for correspondingly shaped edges provided on the dish.

5. A movement mechanism according to any one of the preceding claims, characterized in that the holder is

provided with an outwardly directed, circular edge and the dish, viewed in a section perpendicular to the X-axis, is segment-shaped with an apex angle smaller than 180° , while in at least one extreme position of the dish relative to the holder, a relevant edge half of the dish abuts against the circular edge of the holder.

6. A movement mechanism according to any one of the preceding claims, characterized in that the holder has its outer surface provided with at least one edge against which, in an extreme position of the dish relative to the holder, a corresponding edge of the dish abuts.

7. A movement mechanism according to any one of the preceding claims, characterized in that the bowl or the dish is provided with diametrically opposite thickenings which, upon rotation of the dish relative to the bowl about the Y-axis, cooperate with relevant slots in the dish or bowl respectively that extend in the direction of rotation.

8. A movement mechanism according to any one of the preceding claims, characterized in that the bowl is provided with a thickening and a diametrically opposite slot extending in the direction of rotation, said thickening and said slot, upon rotation of the dish relative to the bowl about the Y-axis, cooperating with a slot in the dish, extending in the direction of rotation, and a diametrically opposite thickening on the dish respectively.

9. A movement mechanism according to claim 7 or 8, characterized in that the bowl is provided with circularly curved edges which, upon rotation of the dish relative to the bowl about the Y-axis, serve as guide edges for correspondingly shaped edges provided on the dish.

10. A movement mechanism according to any one of the preceding claims, characterized in that the holder is provided with an outwardly directed, circular edge, while in at least one extreme position of the bowl relative to

the dish, an edge of the bowl abuts against the circular edge of the holder.

11. A movement mechanism according to any one of claims 7-9, characterized in that in an extreme rotary position of the dish relative to the bowl, the thickenings for rotation and securement of the dish relative to the bowl are located against an end edge of the slots.

12. A movement mechanism according to any one of the preceding claims, characterized in that additional locking means are provided between the dish and the holder and between the dish and the bowl, for blocking a rotation of the bowl, dish and holder relative to each other about an axis, the Z-axis, perpendicular to the X-axis and the Y-axis.

13. A movement mechanism according to any one of the preceding claims, characterized in that the dish is on both sides provided with outwardly set lips, to provide a defined friction between the bowl and the dish and between the dish and the holder.

14. A movement mechanism according to any one of the preceding claims, characterized in that the holder, the bowl and the dish are manufactured from plastic.

15. A movement mechanism according to any one of the preceding claims, characterized in that the holder and the bowl are manufactured from plastic and the dish is substantially manufactured from metal.

16. A movement mechanism according to claim 15, characterized in that the dish is punched from metal.

17. A movement mechanism according to claim 15 or 16, characterized in that the dish is provided with metal springs for realizing a defined friction between the bowl and the dish and between the dish and the holder.

18. A movement mechanism according to any one of the preceding claims, characterized in that the holder, viewed in the X-Y plane, comprises two mutually perpendicular slots provided through the holder, each of said slots

- having an adjusting element provided therein for displacement by motor, said adjusting element being further freely movable in the bowl in a direction, viewed in the X-Y plane, perpendicular to the direction of the relevant slot in the holder, wherein, further, the adjusting element engages, through the relevant slot in the holder, a drive mechanism placed in the holder, said drive mechanism being connected to a motor that is likewise placed in the holder.
- 5 19. A movement mechanism according to claim 18,
- 10 characterized in that on the holder, an adjusting plate for, for instance, a mirror is secured, and that the holder with the components fitted therein and secured thereon can be snapped into the bowl as a unit.
20. A movement mechanism according to claim 19,
- 15 characterized in that the holder comprises an electric plug terminal, while on the adjusting plate, a separate electric terminal is present for an electric connection to the plug terminal on the holder.
21. A wing mirror for a vehicle, comprising a movement
- 20 mechanism according to any one of the preceding claims.